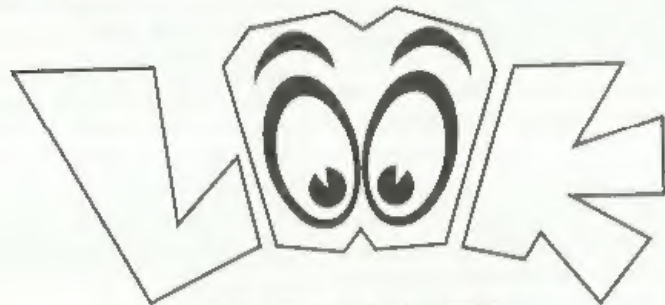


DO YOU HAVE A FRIEND WHO IS
LOOKING FOR THE VERY BEST IN

SAM, Spectrum
or PC

SUPPORT?

THEN TELL THEM THEY NEED



NO FURTHER

Just send us their name and address and we will send them
the details of INDUG membership and all we have to offer.

Go On, Do Your Friend A Favour - And Yourself.

INDUG

The INDEPENDENT User Group

% FORMAT PUBLICATIONS, 34, Bourton Road, Gloucester, GL4 0LE.
Telephone: 01452-412572. Email: FormatPub@aol.com

Vol.11 Nº10.

June 1998.

FORMAT

THE HOME OF Z80 COMPUTING



Relax, And Enjoy A Summer
With **FORMAT.**

£2.00 (UK R.R.P.)

ISSN 0963-8598.

SD Software



QUALITY SERIOUS SOFTWARE FOR SPECTRUM & SAM.

THE FRACTAL COLLECTION

A fast fractal generator for the ZX Spectrum. Now you can explore the fascinating world of fractals with this machine code program. Up to 200 shades on screen gives clear, crisp fractal pictures which can then be zoomed and expanded. Not just the Mandelbrot set but 18 different types can be made. Generates fractal music, you can hear the computer generate the fractal. Ready to use on disc for DISCIPLE/Plus D complete with ready-converted file for use with our SPECMAKER emulator on SAM.

SPECFILE+ The Spectrum data filing program that never gets out of date. Specfile+ holds a massive 28K of data and, by using compression makes it seem like much more. Free-format style means no complicated file design before you get started. Very fast CASE selective and complex searches. Designed to be extended - so it grows as you do. Works with PLUS D, DISCIPLE or under SpecMaker on SAM. This program is a must for anyone with data to store. *Special +3 version also available on 3" disc - add £2 to price shown below.*

UNIDOS version 2. The advanced DOS from Steve Warr for the PLUS D and DISCIPLE. Same DOS system file for BOTH interfaces. Random Access Files; Sub Directories; Hundreds of files on one disc; Hidden files; Protected files; Copy files of ANY length; incredibly versatile Screen Dump routines; Error Trapping and MANY more features. Compatible with all Spectrums (+2a/+3 in 48K mode). Over 20 programs now included on the disc. Extra manual on using Create files also available. *State DISCIPLE or PLUS D on order.*

SPECMAKER The simplest Spectrum emulator on the market for SAM. 1000s of 48K programs work without the need for any conversion. Most other programs need only minor changes. All the extra SAM keys work in Spectrum mode. Uses SAM's printer port and up to 360K of SAM's memory as a RAMDISC. PLUS D, DISCIPLE and Opus discs* can be loaded into SPECMAKER and saved to SAM disc. Converts files between Messenger and SPECMAKER format to save valuable disc space. Comes with pre-converted Spectrum ROM image (no need for Spectrum). Supplied on 3.5" disc.

PC-SUITE From the same author as SPECMAKER. Now you can transfer your IBM data files by reading and writing IBM discs (720K format) on your SAM Coupé. PC-SUITE will even let you format IBM discs on your SAM. Write and edit SAM Basic programs on your PC. Use PC-SUITE to copy SAM data files to PC so you can print them on that high quality laser printer at work...

Supplied on 3.5" disc. *nb. This is not a PC emulator.*

As used by Format Publications to transfer articles and programs for this mag.

PRICES:	Non Members	INDUG Members
The Fractal Collection	£5.95	£4.95
Specfile+	£12.95	£9.95
UNIDOS	£25.95	£19.95
Createfile Manual	£6.50	£5.50
SpecMaker	£12.95	£9.95
PC Suite	£25.95	£19.95
File Convertor*	£5.30	£4.00
Hacker's Workbench*	£9.90	£8.50

* CDOS programs still available

Please add £0.50 postage (£1.20 outside UK)

Spectrum Owners

Don't forget to say if ordering for PLUS D or DISCIPLE and state disc size - 3.5" or 5.25" (80 track only).

INDUG MEMBERS

Don't forget your membership number if claiming discount.

S.D. Software.

c/o Format Publications,
34, Bourton Road,
Gloucester,
GL4 0LE.

STOP PRESS: The full range of SD's software and hardware will return in the next few months, if there is anything not listed above that you really need then phone Bob on 01452 412572 and he will do his best to help.

CONTENTS

Vol.11 N°10.

June 1998.

- **NEWS ON 4** - Our round up of the stories that affect you. . . . 4
- **Editorial** - A short one this month (is that cheering I hear?) . . . 5
- **Writing For FORMAT** - You can do it, yes you can. . . . 5
- **Short Spot** - The affable John Wase brings you some real gems in another collection of programming snippets, hints and tips. . . . 7
- **Tape Routines** - Ever wondered how the Spectrum's tape system works - well here are all the details. . . 15
- **Keep It Simple** - That, it appears, is the way to better programming. While written for SAM users I think Spectrum programmers will find this interesting as well. . . 17
- **Small Ads** - For Sale, Wanted, Contacts. This is the place. . . 20
- **Your Letters** - Our mailbag has been bulging this month I'm pleased to say (keep it up readers, we like it this way) so here are a selection of your letters on a wide variety of subjects. . . 21
- **FORMAT Readers Service Page** . . . 27

THIS MONTHS ADVERTISERS:-

FORMAT - SAM C SPECIAL OFFER	20
FORMAT (SAM REPAIR SERVICE)	20
INDUG	Back Cover
REVELATION SOFTWARE	14
S.D.SOFTWARE	2
WEST COAST MAIL ORDER	6

FORMAT ISSN 0963-8598

© Copyright 1998 FORMAT PUBLICATIONS. All Rights Reserved.

No part of this publication may be reproduced, in any form, without the written consent of the publisher. The purchaser of this magazine may copy program material published herein for his or her own personal use and provided that any such programs are erased if and when the purchaser disposes of this magazine in any way. While every effort is made to ensure accuracy in **FORMAT** the publisher will not be held liable for any errors or omissions. The views expressed in articles in this magazine are not necessarily those of the publisher.

FORMAT is published by **FORMAT PUBLICATIONS.**

34, Bourton Road, Gloucester, GL4 0LE, England.

Telephone: 01452-412572 Email: Formatpub@aol.com

NEWS ON 4

NEXT NORTHERN SHOW

The date has been set for the next Northern SAM and Spectrum Show - though this time it will not be in Wetherby, but 63 miles away in Bolton, Lancashire.

The show will be held on the 12th September in the Horwich district of Bolton. The organizers claim there will be better parking and easier access by train and bus.

For more details send an SAE to: NSSS, 32 Barleyfields Road, Wetherby, West Yorks, LS22 6PW.

TURBO YOUR SPECTRUM

Machine code may produce faster running programs on the Spectrum, but it is a lot harder to write than Basic. So Spectrum users will be pleased to hear that Nottinghamshire based Grafix Wizards have just launched a new version of their Turbo Basic compiler.

Turbo 2.5 is a fast integer Basic compiler which converts most Spectrum Basic programs into very fast running machine code (on average 10 times faster than normal Basic). Programs up to about 16K long can be compiled and Turbo allows the programmer to specify the address at which the resultant code can be run - this allows even larger programs to be built up in sections. An added bonus with Turbo is that the compiler does not need to be in memory when the compiled code is run, some other compilers needed a large amount of memory to supply 'run-time' routines many of which were rarely used by a program.

Johnathan Cauldwell, author of Turbo 2.5, says there are no copyright

restrictions placed on the code produced by the compiler, so this will allow programmers to produce professional looking programs without the need to resort to machine code and all the hard work that would be required.

The package is available now by sending a cheque/PO for a very reasonable £4.99 to: Grafix Wizards, 5, Helmsley Drive, Eastwood, Notts, NG16 3RS. If you already have an earlier version then send the original with a payment of £2 for the upgrade. Overseas customers please add £1 to those prices.

SIR CLIVE'S NEW LOVE

Uncle Sir Clive Sinclair is dating a stunning 21 year old former Miss England Angie Bowness. He first met her at London night-spot *Stringfellows* where she works as a dancer. Angie looks set to move in to Clive's London home fairly soon, together with her 4 month old son (from a previous relationship) called Marcus.

Shy Sir Clive is renowned as a 'bit of a ladies man' having dated a number of young women since his 22 year marriage to Ann Briscoe ended in divorce in 1985. Could this be the real thing?

YOUR NEWS HERE...

Come on readers, we need your news. Anything related to computers which you think will interest other SAM and Spectrum owners. Just jot it down on a piece of paper, add your name and membership number, and send it off to us at the usual address. Please mark the envelope 'News' so that we can give it the priority it deserves.

Remember, you get three months extra subscription for every news item we print, so don't rely on others to send in an item you have seen - send it off yourself and earn our thanks as well. This month's credits:-



I would like to start this month's editorial with a quick run-down on the latest situation regarding FRED. There is still no concrete sign of the full relaunch of Fred Publishing although Colin MacDonald is working hard to ensure that the new management take over as soon as possible. Currently it looks as if George Boyle will be taking over (rather than Allan Clarkson as originally thought) but it appears that there has been some delay in getting the contracts signed. There is a possibility that George will produce an issue of FRED in the next few weeks but we will have to wait and see. For now if anyone needs to get hold of a Fred product then the best thing to do is to ring us at **FORMAT**. We do have some stocks here which we normally reserve for shows, but please ring first as there are a few items we can't supply.

While mentioning George Boyle, he is now the organizer of the Northern Spectrum & Sam Show, you will find details of the next NSSS in this month's **News On 4**. Sadly as it is too close to the Gloucester show on the 17th October, and because of other commitments that weekend, **FORMAT** will not be able to attend.

Next month, we plan to launch a new **INDUG** membership drive - covering both the Z80 and the PC side - something that will affect everyone. There will be opportunities to claim extended memberships, discounted software and the chance to win a **CASH PRIZE** so don't, what ever you do, miss next month's **FORMAT**.

And finally, the papers are full of Uncle Clive's love affair with a 21 year old beauty. Some condemn him for being 36 years older. All I can say is, good luck Sir Clive, I hope you do find a little happiness.

Until next month.

Bob Brenchley, Editor.

Writing for **FORMAT**

Yes, I know I keep nagging you to write something for **FORMAT**, but it is for your own good you know.

FORMAT is very special because it is written by enthusiasts. No 'paid hacks' who will get their money even if they produce unintelligible or boring drivel. Everything is written by enthusiasts for enthusiasts and that is what has made **FORMAT** so successful that we are fast approaching our **ELEVENTH** birthday. Just think of all the other magazines that have come and gone in that time.

But we can't afford to rest on our laurels. If we want to be successful in our second decade then we need new writers all the time. And YOU can be one of them. Oh yes you can, there is something that each and every one of you can do.

We need your contributions. Letters, items for Short Spot, questions for the Help Page, articles - both large and small, reviews, news.....

There are so many ways in which each of you can help us to keep **FORMAT** going well into the new millennium - but we do need your help and we need it **NOW!**

You don't have to be a brilliant writer to contribute, you just need something to say - and every one of you out there has something to say. It is our job to edit your contribution into shape for **FORMAT** - and that is a job we love to do. So come on, get writing, even the smallest items is better than nothing.

Please, do your bit to help, you can't expect others to contribute if you don't. Honest, it doesn't hurt, and you will have the pleasure of seeing your work in print - extra copies of **FORMAT** to pass on to relatives will be available at discount prices ☺.

Now remember, ring us if you need help or ideas, that is what we are here for. Now get writing.

SAM elite 512

The advanced computer that retains a user friendly appeal which makes even the beginner feel right at home. An easy to learn Basic and disc operating system (no messing with slow tapes here) will allow you to do things you never thought possible before. Your SAM comes with a very easy to read manual and everything you need to get started - it even has some pretty impressive demo software for you to run, just to give you a few ideas for starters.

If you already own a Spectrum then this is the machine for you because you don't have to throw away all you have learnt so far - just be prepared to be amazed at the extra power and features.

POWER AT A PRICE YOU CAN AFFORD...

FEATURES INCLUDE

- 512K RAM
 - 32K ROM
 - 800K Floppy Disc Drive
 - 6 Channel Stereo Sound (mono through TV)
 - Z80B 6Mhz Processor
 - Centronics Printer Port
 - Joystick Port
 - MIDI & Networking
 - 128 Colours
 - 4 Screen Modes
 - SCART Output (for Monitor or TV)
- Plus LOTS More....

ONLY £199⁹⁵

Includes 1 year return to base warranty on full computer PLUS extended 2nd year warranty on main board.

Reconditioned SAM Coupé

We are able to supply a small number of professionally reconditioned SAM Coupé computers. These have been fitted with a modern style disc drive, a version 3 ROM, new keyboard unit, and are supplied with new manuals and DOS system disc. They carry a full 90 day full return to base warranty. Because these are reconditioned machines there may be slight blemishes to case or base.

Has All The Features Of The SAM Elite, Except That There Is No Built-in Printer Port On The Coupé (see the SPI, under interfaces below)

ONLY £149⁹⁵

SAM Coupé Replacement Disc Drives

The original slot-in slim-line drives produced for the SAM Coupé are no longer made. If your existing drive is now showing signs of terminal decline perhaps it is time you gave your SAM a new lease of life by fitting a modern style (PC type) floppy drive.

In most cases we find the faults with old drives are mechanical (due to worn heads, stepper motor failure, etc.) In these cases you need an internal interface Type 1 to which you transfer the 1772 disc controller chip from your old drive - thus making the upgrade as cheap as possible.

If you want to fit a second drive (or first drive, if you don't have one or the 1772 on your old drive is faulty) then order a Type 2.

Both types are available in either kit form or ready assembled. For the kit you will need screwdriver, soldering iron, solder and a reasonable level of soldering skills. All you need for the assembled version is a screwdriver. Full fitting instructions are given and the only other thing you need is a standard PC type disc drive from your local supplier (cost about £20 to £25).

If you have any doubts about which type of interface you need, or any questions about the drive fitting in general, then please give the FORMAT hotline a ring on 01452-412572 and they will be pleased to help you.

	Kit Form	Assembled
Internal Disc Interface Type 1 (without 1772)	£19.95	£29.95
Internal Disc Interface Type 2 (including 1772)	£34.95	£44.95

Ordering: Write your order clearly, state your name, full address and phone number and if possible please quote your INDUC number as this will help to speed orders. Payment: Cheques and UK Postal Orders should be made payable to FORMAT PUBLICATIONS. Overseas customers may also pay using FORMAT's foreign exchange scheme. Postage & Packing: Prices include UK p.p.p. Overseas customers please write for a quote. Prices valid for 90 days from date of publication. £ & O.E.

Send Your Orders To:

West Coast Mail Order,
c/o Format Publications,
34, Bourton Road,
Gloucester,
GL4 0LE.

West Coast Computers

INTERFACES

These interfaces work with both the SAM elite and the SAM Coupé unless otherwise stated.

SAM MOUSE SYSTEM Interface, High Quality Mouse and the Software to drive it. The interface plugs into the mouse port on the back of SAM so you don't need a spare expansion socket. More and more software now works better if you use a mouse. **Only £39.95**

SAM PRINTER INTERFACE The SPI (Coupé only) allows connection to any standard parallel printer. Allows standard LPRINT, LIST & DUMP commands to work on compatible printers. Plugs straight into the expansion port. Requires BBC type 26 way ribbon printer cable (see below). **Only £24.95**

TWOUP Allows two interfaces to be connected to SAM's expansion port at same time. **Only £19.95**

XDI The eXternal Disc Interface. Allows external 3 1/2" or 5 1/4" drive to be connected to SAM Coupé. Also includes Parallel Printer Interface. **Only £44.95**

ALSO AVAILABLE: Printer Cable - £7.95, SCART Cable - £7.95, Replacement Keyboard £14.95, Replacement Power Supply - please ring. Plus spare parts service - tell us what you want and we will give you a price..

SHORT SPOT

YOUR HINTS, TIPS AND PROGRAMMING IDEAS

Edited By:- John Wase.

It's June; hot, flamin' June. So on with your summer gear, hang your rainhat in the hall, and while you're waiting for it to go over, take a little read of your **FORMAT**, and think about what you might send me later in the year. Talking of sending me things, I owe Maurice Smith of Ipswich one big apology. It's not me, Maurice, and I know you sent it in last summer. Every time I include this game, Bob cuts it out again, so that Short Spot just fits the allotted space. So I'm starting with it this time, Bob, so there! It's a nice little game for SAM - SAM enthusiasts have been a bit short lately, since Miles has had such a lot of interesting stuff, and as there is still more, I feel guilty. This game's called 'Boggle', and SAM should display cubes with a different letter on each face, jumbled into a 4x4 grid. Players try and find as many words as possible using the letters in sequence in any direction. Letters can only be used once in each word, and words must be of three or more letters. Three and four letter words score one point, five letters score two points, six score three, seven score five and eight score nine. You score points only for words that no other player has found. The winner is the player with most points after the ten rounds.

The original game was written by D. L. Webster, and published in the November 1986 issue of *Sinclair User*. Maurice does not think this has been released before for SAM, although there was another game called Boggle which involved rearranging sliding blocks, which Maurice thinks should have been called Joggle, or Juggle or something, so as not

to clash with this one.

The game can be played with two players, but works best when several players compete. Then the words that some people find can make your mind boggle! The time delays are controlled by PAUSE statements in lines 810 and 850 and can easily be adjusted. The DATA blocks of letters have also been modified to match more closely the letters on the cubes of the actual board game. The main advantage of having it on SAM instead of the commercial version is that while you avoid the clatter and rattle of shaking cubes, you nevertheless end with the letters on them all nicely the right way up! Here it is: get typing.

```

1 REM BOGGLE by D L Webster
  first published in
  Sinclair User Nov.'86
2 REM Converted to SAM and
  modified by M Smith Oct.'97
10 MODE 1: CLS
20 DIM b(16): DIM b$(16,1)
30 OVER 0: LET a=0: LET ac=0:
  LET z=0
50 GOSUB 1030
60 GOSUB 100: CLS
70 GOSUB 590
80 GOSUB 460
90 GOTO 230
100 IF ac=10 THEN GOTO 1440
110 FOR z=1 TO 16
120 LET a=INT (RND*16+1)
130 LET b(z)=a
140 FOR y=1 TO z-1
150 IF a=b(y) THEN GOTO 120
160 NEXT y
170 RESTORE (a*10)+1520
180 READ a$
190 LET c=INT (RND*6+1)
200 LET b$(z)=a$(c)

```

```

210 NEXT z: LET sc=sc+1
215 REM LET letter$="": FOR z=
  1 TO 16: LET letter$=lette
  r$+b$(z): NEXT z: LPRINT l
  etter$
220 RETURN
230 BEEP .1,10: PRINT AT 21,0;
  "   PRESS ANY KEY TO STA
  RT   ": PAUSE 0
240 PRINT PAPER 5; AT 21,0;"

      ": REM 32 spaces
245 PRINT PAPER 6; AT 1,6;c$
250 LET d=0
260 BEEP .1,10
270 FOR l=4 TO 16 STEP 4
280 FOR r=4 TO 16 STEP 4
285 BRIGHT 1
290 PRINT AT l-1,r-1;CHR$ 143;
  CHR$ 143; CHR$143
300 PRINT AT l,r-1;CHR$ 143;"
  "; CHR$143
310 PRINT AT l+1,r-1;CHR$ 143;
  CHR$ 143; CHR$143
320 LET d=d+1
330 INVERSE 1
340 IF b$(d)="Q" THEN PRINT AT
  l,r;"Qu": GOTO 360
350 PRINT AT l,r;b$(d)
360 INVERSE 0
370 NEXT r: NEXT l
380 IF e=1 THEN LET e=0: GOTO
  970
390 GOSUB 790
400 FOR l=4 TO 16 STEP 4
410 FOR r=4 TO 16 STEP 4
420 PRINT AT l,r;CHR$ 143; CHR
  $ 143
430 NEXT r: NEXT l
440 GOSUB 930
450 GOTO 230
455 PRINT PAPER 6; AT 1,6;c$
460 FOR l=27 TO 155 STEP 32
470 LET r=20
480 PEN 2
490 PLOT r,1: DRAW 128,0
500 PLOT r,l+1: DRAW 128,0
510 NEXT l
520 FOR r=19 TO 147 STEP 32
530 LET l=27
540 PLOT r,1: DRAW 0,129
550 PLOT r+1,l: DRAW 0,129

```

```

560 NEXT r
570 PEN 0
580 RETURN
585 PRINT PAPER 6; AT 1,6;c$
590 FOR l=2 TO 18
600 PRINT PAPER 6; AT 1,2;"
      ": REM 17 sp
      aces
610 NEXT l
620 FOR l=2 TO 18
630 PRINT PAPER 6; AT 1,21;"
      ": REM 9 spaces
640 NEXT l
645 PRINT PAPER 6; AT 1,6;c$
650 PRINT PAPER 0; PEN 7; AT 2
  ,29;" "; AT 2,21;"ROUND: "
  ;sc
660 PRINT PAPER 0; PEN 7; AT 1
  8,21;"TIME LEFT"
670 PRINT PAPER 0; PEN 7; AT 4
  ,24;"MAX"
680 PRINT PAPER 0; PEN 7; AT 1
  6,24;"MIN"
690 FOR l=48 TO 71
700 PEN 2
710 PLOT 192,1: DRAW 23,0
720 NEXT l
730 FOR l=72 TO 135
740 PEN 4
750 PLOT 192,1: DRAW 23,0
760 NEXT l
770 PAPER 7: PEN 0
780 RETURN
790 OVER 1: PEN 4
800 FOR l=135 TO 72 STEP -1
810 PAUSE 50
820 PLOT 192,1: DRAW 23,0
830 NEXT l
840 FOR l=71 TO 48 STEP -1
850 PAUSE 30
860 PEN 2
870 PLOT 192,1: DRAW 23,0
880 BEEP .005,80-1
890 NEXT l
900 PEN 0
910 OVER 0
920 RETURN
930 PRINT AT 21,0;"   PRESS
  ANY KEY TO REVEAL   ": PA
  USE 0
940 PRINT PAPER 5; AT 21,0;"

```

```

      ": REM 32 spaces
950 LET d=0
960 LET e=1: GOTO 250
970 GOSUB 100
980 PRINT AT 21,0;"   PRESS AN
  Y KEY FOR NEW ROUND   ": PA
  USE 0
990 BEEP .1,10
1000 PRINT PAPER 5; AT 21,0;"

      ": REM 32 spaces
1010 IF sc>1 THEN GOSUB 645
1020 RETURN
1030 LET c$=" BOGGLE - A WORD G
  AME "
1040 BORDER 1: PAPER 5: PEN 0:
  CLS
1080 PRINT PAPER 6; AT 2,6;c$
1400 PRINT PEN 0; PAPER 6; FLAS
  H 1; AT 9,0;"

      ": REM
      32 spaces
1410 PRINT PEN 0; PAPER 6; FLAS
  H 1; AT 10,0;" COMPUTER TH
  INKING-PLEASE WAIT "
1420 PRINT PEN 0; PAPER 6; FLAS
  H 1; AT 11,0;"

      ": REM
      32 spaces
1430 RETURN
1440 PRINT AT 21,0; FLASH 1;"
  ****   GAME   OVER   ****
  "
1450 PRINT PAPER 1; PEN 7;#0;"P
  RESS (Y) FOR NEW GAME-(N)
  QUIT"
1460 GET z$
1470 IF z$="" THEN GOTO 1460
1480 IF z$="n" OR z$="N" THEN S
  TOP
1510 CLEAR
1520 GOTO 20
1530 DATA "MAQHNI"
1540 DATA "APSHCO"
1550 DATA "TOWOTA"
1560 DATA "SOSITE"
1570 DATA "BEJOAB"
1580 DATA "MUOCIT"
1590 DATA "ENSIEU"
1600 DATA "LEYTRT"
1610 DATA "TYTDSI"
1620 DATA "RNZHLN"

```

```

1630 DATA "GUEAON"
1640 DATA "EWGNHE"
1650 DATA "IXRDLE"
1660 DATA "AFPSKF"
1670 DATA "WRETVH"
1680 DATA "DVYREL"
9000 SAVE "Boggle" LINE 10

```

Thanks, Maurice.

Now over to Miles Kinloch of Edinburgh, who, you remember, was featured last month. There wasn't quite room for all of it, however, and Bob also had a little bit left over, so I think the best thing I can do is to include these before we forget what the first bits were about. Now you remember in last month's *Short Spot* that there was an interesting multi-sector load in Betados? You've forgotten already? Check it out, and you'll find I do not lie; there it is. Well; Miles has used this in a short, rapid sector-checking program called 'Disc Check'; again, stuff that I had intended for last month. Unlike other similar programs, this one is designed to take advantage of the Betados multi-sector LOAD @ command, making it run almost as quickly as if it were in machine code. Some of you may be curious about the RANDOMIZE USR 56 in Line 100: well, Miles has included this to ensure the interrupts are still enabled after all the drive operations, avoiding a well-known Z80 bug that affects the PLUS D.

Here it is:-

```

10 REM   DISC CHECK
20 REM   (BETADOS ONLY)
30 REM   BY MILES KINLOCH
40 REM
50 CLEAR 24575
60 INPUT "Use which drive? ";d
  : IF d<>1 AND d<>2 THEN GO
  TO 60
70 PRINT "INSERT DISC THEN PRE
  SS ANY KEY": PAUSE 0: CLS :
  PRINT "CHECKING - PLEASE W
  AIT. . . "
80 FOR a=0 TO 72 STEP 8: LOAD
  @d,a,1,24576,80: NEXT a

```



```

90 FOR a=128 TO 200 STEP 8: LO
AD @d,a,1,24576,80: NEXT a
100 PRINT "NO SECTOR ERRORS": R
ANSOMIZEUSR 56: STOP
9999 SAVE d*"DISC CHECK" LINE 10

```

Smashing. I know I've still got some more stuff from Miles (like stuff on making printfiles on disc from Wordmaster output), but we'd better let someone else have a go for a change. So more of Miles in the months to come. And thank you, Miles - you always manage to send me something new and unusual.

Now back to SAM for a while, since we've rather neglected SAMenthusiasts (Samusiasts?) recently! Dave Marriott of Long Eaton writes that he has a few oddments for me, but doesn't know how much use they are, as they are mostly public domain info on SAM, which tends to be easy to find, except when you actually need it!

PRINTER ONLINE CHECK: the expression IN 233 BAND 1 will return zero if there is a printer connected to the parallel port and online, or 1 if not.

MEMORY SIZE: PEEK SVAR 692 will return 31 if it's a 512K SAM or 15 if it's 256K.

PALETTE DEFAULTS: the actual Palette numbers of the default colours 0 to 15 are, respectively: 0, 16, 32, 48, 64, 80, 96, 120, 0, 17, 34, 51, 68, 85, 102, 127.

PAGE ALLOCATION TABLE: FOR x=20736 TO 20767 : PRINT PEEK x : NEXT x will show the usage of the 32 RAM pages; value 0 = Free, 32 = Utility, 48 = MasterDOS/MasterBasic, 64 = Basic, 96 = DOS, 192 + Screen. (On a 256K SAM, the last 16 pages will be set to 255, meaning Page does not exist).

SCREEN INFORMATION: The 16 bytes from 23712 to 23727 represent screens 1 to 16; for each entry, if the byte value is 255, the screen is closed; otherwise the second and third bits (from the left) are 00, 01, 10 and 11 for Modes 1 to 4 respectively, and the rightmost 5 bits

give the start page number of the screen (it will occupy this and the following Page).

That's a *Really Useful List*, Dave: as you say, you can never find this sort of thing when the need is pressing! Our grateful thanks.

Now, over to George Siougas, all the way from Trikala, Greece. George writes that he wrote earlier, but it looks as though his letter has gone astray, so it's just as well he sent another copy.

The first program that George has written is a nice little routine for reading IBM discs (720K format) with a PLUS D. It needs Beta Basic 3.0 or 4.0, and has a display output, as it uses two windows: one for HEX output, and one for ASCII characters. With a minor modification, it could be used to read PLUS D discs as well, and display them in the same fashion. George has used it a couple of times to try to locate a Word 6 text file. Not only did he succeed (and if you've used Word, you'll know what a lot of junk there is on a file besides the text you're trying to transfer) but George managed to read it in manageable pieces (LOAD @), and then was able to pass it on to DTP's Word Master. Here, he was able to get rid of the now-useless Word 6 control codes. This program could be rather useful to SAM users, too, as Beta Basic is very close to SAM Basic.

Load Beta Basic, type this program into your Spectrum, then transfer an IBM PC file (Word 6 that George used is a good example) and see if you can translate it!

```

5 REM IBM (720K) READ
7 REM ©1995 GEORGE SIOUGAS
10 WINDOW 1,0,175,192,176: WIN
DOW 2,192,175,64,176
11 WINDOW 1: CSIZE 4,8: WINDOW
2: STEP 4,8: BRIGHT 1: CLS
: WINDOW 0
20 FOR t=0 TO 79
25 FOR s=1 TO 9: REM Change it
to 10 to read PLUS D discs

```

```

30 LOAD @1,t,s,39000
35 LET a$="Track:"+STR$ t+" S
ector:"+STR$ s
40 PRINT WINDOW 1; INVERSE 1;a
$: INVERSE 0;" ";STRING$ #S
(47-LEN a$,"-")
42 IF INSTRING(1,MEMORY$(390
00 TO 39254),STRING$(255,CH
R$ 246)) THEN IF INSTRING(1
,MEMORY$(39255 TO 39509),
FN STRING$(255,CHR$ 246)) T
HEN IF PEEK 39510=246 THEN
IF PEEK 39511=246 THEN PRIN
T WINDOW 2;***** FORMAT ***
*: GOTO 85: REM When a who
le sector contains the numb
er 246 (change it to 0 for
PLUS D discs), it means tha
t it is formatted and null
45 PRINT WINDOW 2;STRING$(16,"
-")
50 FOR n=39000 TO 39511
55 IF INKEY$<>" " THEN PRINT WI
NDOW 1: PRINT WINDOW 2: GOT
O 85
60 PRINT WINDOW 1;HEX$(PEEK n)
;" ";
70 IF PEEK n>31 AND PEEK n<128
THEN PRINT WINDOW 2;CHR$ P
EEK n;: ELSE PRINT WINDOW 2
;" ";
80 NEXT n
85 POKE 23692,0: NEXT s
90 NEXT t

```

The next two programs are conversions of the well-known SECTOR MAP and RECOVER. George has modified them so that they will work with BetaDOS and its extended directory formats. Both these programs read the directory size first. If it is less than or equal to seven tracks, then they read it all in one go. However, if it is bigger, they read it in groups of seven tracks, to avoid memory limitations. In other words, if the directory is a 15-track one, they firstly read the first seven tracks, do what they are supposed to do, then go back and read the next seven tracks, do what they are supposed to do again, and finally read

and deal with the one remaining track, all this to-ing and fro-ing being invisible to the user. A good thing, too, say I!

These programs both use the same main algorithm, which means that quite large chunks can be reused, giving you less typing. If you are puzzled by line 8 (POKE @124,4), the explanation is as follows. Line 90 does a short CAT without printing any files: George has done this because in doing so, it writes up the system variable @124, and so George can use this to PEEK at the directory size number; that is the number of directory tracks. If @124 already holds a big number from a previous disc, you get an 'Out of memory' error report, without writing up @124 with the correct current value, but instead leaving the previous big value. The appearance of this bug depends on the directory size that BetaDOS 'expects' to read. So BetaDOS can read a big directory after a small one, but not the other way round. This doesn't happen with a normal CAT; only with the short one, so it clearly has to do with the low RAMTOP and the memory that BetaDOS has tried to reserve for alphabetical sorting. Trouble is, the normal CAT has a built-in CLS, so the solution is always to POKE @124 with the lowest number (4-track directory), as George has done, and fool BetaDOS into always expecting this. Then everything will work fine.

Another bug in the short CAT routine, which occurs only for low RAMTOP conditions, is that it doesn't display files whose directory slot number is bigger than 80. This means that if you have to use the short CAT within a program which has RAMTOP low, like Word Master and almost every professional program, and your disc has an extended directory, then all you can do is use the normal CAT which is not so neat. When appealed to, Miles Kinloch told George "This bug is too difficult to overcome, as it needs quite a lot of free memory". Pity,

says George, for he bought BetaDOS principally for its extended directories. However, the difference between CAT and CAT! is merely a matter of tidiness, and fortunately, CAT always works.

An interesting point about George's RECOVER program: when it comes to un-erase a file, it calculates from its position in memory the position on the disc (track, sector) and uses the SAVE @ command to overwrite only this sector. Although it would have been much easier to overwrite all the (up to) seven tracks that you had transferred to memory, this would be less reliable: by SAVING only the right sector, you overwrite only at worst 2 file entries in the directory, and one of these is the erased file. This minimises any errors caused by unexpected problems like memory corruptions.

Here they are then; first is SECTOR MAP; get typing!

```

5 REM SECTOR MAP
10 REM for BETADOS
15 DEF FN s(x)=USR 8
20 CLEAR 28999
30 PRINT INVERSE 1;" DISC-FIL
E SECTOR MAPPER v2.0 "
40 PRINT #0;"Drive number 1 or
2?"
45 LET l$=INKEY$: IF l$="" THE
N GOTO 45
50 IF l$="1" THEN LET d=1: GOT
O 60
55 IF l$="2" THEN LET d=2: GOT
O 60
58 GOTO 45
60 PRINT #0;"Screen or Printer
?"
70 LET l$=INKEY$: IF l$="" THE
N GOTO 70
71 IF l$="s" OR l$="S" THEN LE
T c=2: GOTO 75
72 IF l$="p" OR l$="P" THEN LE
T c=3: GOTO 75
73 GOTO 70
75 INPUT ,: PRINT "' BRIGHT 1
,'" * Reading the directory
size * "'

```

```

80 POKE @124,4
90 CAT d" ""!
95 LET files=20*FN s(124+8192)
100 PRINT "' TAB 1; BRIGHT 1;"
Directory: ",files;" files,
",files/20;" tracks"
104 LET times=files/140: IF tim
es>INT times THEN LET times
=1+INT times
106 FOR q=1 TO times
107 LET t=(q-1)*7: LET left=(fi
les-(q-1)*140)/20: IF left>
7 THEN LET left=7
108 LOAD @d,t,1,29000,left*10
110 FOR p=0 TO left*20-1
120 LET pnt=29000+p*256: IF PEE
K pnt=0 THEN GOTO 270
130 DIM n$(10)
140 FOR i=1 TO 10: LET n$(i)=CH
R$ PEEK (pnt+i): NEXT i
150 PRINT #c'" INVERSE 1;"P";p+
1+140*(q-1); TAB 5;" """;n$;
""""
160 LET t=PEEK (pnt+13): LET s=
PEEK (pnt+14)
170 LET size=PEEK (pnt+12)+256*
PEEK (pnt+11)
180 LET count=0
190 PRINT #c;t;"/";s;" ";
200 LOAD @d,t,s,65000
210 LET t=PEEK 65510: LET s=PEE
K 65511
220 LET count=count+1
230 IF ((t>files/20-1 AND t<80)
OR (t>127 AND t<208)) AND
(s>0 AND s<11) THEN GOTO 19
0
240 IF size<count THEN PRINT #c
; FLASH 1;count-size;" EXTR
A SECTOR(S) FOUND."
250 IF size>count THEN PRINT #c
; FLASH 1;size-count;" SECT
OR(S) SHORT."
260 INPUT ,
270 NEXT p
280 NEXT q

```

And here is the Recover program:-

```

5 REM RECOVER
10 REM for BETADOS
15 DEF FN s(x)=USR 8
20 CLEAR 28999

```

```

30 PRINT INVERSE 1;" ERASED
FILES RECOVER v1.0 "
40 PRINT #0;"Drive number 1 or
2?"
45 LET l$=INKEY$: IF l$="" THE
N GOTO 45
50 IF l$="1" THEN LET d=1: GOT
O 60
55 IF l$="2" THEN LET d=2: GOT
O 60
58 GOTO 45
70 LET c=2
75 INPUT ,: PRINT "' BRIGHT 1
,'" * Reading the directory
size * "'
80 POKE @124,4
90 CAT d" ""!
95 LET files=20*FN s(124+8192)
100 PRINT "' TAB 1; BRIGHT 1;"
Directory: ",files;" files,
",files/20;" tracks"
104 LET times=files/140: IF tim
es>INT times THEN LET times
=1+INT times
106 FOR q=1 TO times
107 LET t=(q-1)*7: LET left=(fi
les-(q-1)*140)/20: IF left>
7 THEN LET left=7
108 LOAD @d,t,1,29000,left*10
110 FOR p=0 TO left*20-1
120 LET pnt=29000+p*256: IF PEE
K pnt=0 AND PEEK (pnt+1)=0
THEN GOTO 270
130 DIM n$(10)
140 FOR i=1 TO 10: LET n$(i)=CH
R$ PEEK (pnt+i): NEXT i
150 IF PEEK pnt<>0 THEN PRINT #
c'" INVERSE 1;p+1+140*(q-1)
; TAB 3;" """;n$;" """; GOTO
160
155 PRINT #c'" INVERSE 1;p+1+14
0*(q-1); TAB 3;" """;n$;" """;
INVERSE 0;" "; BRIGHT 1;"E
RASED";
156 INPUT "'ENTER' leaves it er
ased or giveFile type (1-11
) to recover:"; LINE w$
157 IF w$="" THEN PRINT : GOTO
160
158 IF VAL w$<1 AND VAL w$>11 T
HEN GOTO 156
159 PRINT BRIGHT 1; FLASH 1;"Re

```

```

covering": POKE pnt,VAL w$:
GOSUB 300
260 INPUT ,
270 NEXT p
280 NEXT q
290 STOP
300 LET svtr=t+INT ((pnt-29000)
/5120)
310 LET svsec=1+INT ((pnt-(svtr
-t)*5120-29000)/512)
320 LET svmem=29000+512*INT ((p
nt-29000)/512)
330 SAVE @d,svtr,svsec,svmem
340 RETURN

```

Just a reminder from George, before we finish. RECOVER un-erases a file which has *just* been erased, so you can use RECOVER only when there have been no other alterations on the disc (e.g. new SAVES) after the ERASE. Just before RECOVER comes to unerase a file, it asks for its file type. This is actually the Directory Description byte: a number in the range 1-11 which describes the erased file where 1 is a Basic Program, 2 is a Data Array, 3 is a String Array, 4 is a Code File, 5 is a 48K Snapshot, 6 is a Microdrive Type File, 7 is a Screen\$ File, 8 is a Special File, 9 is a 128K Snapshot, 10 is an Opentype File and 11 is an Execute File.

Many thanks George. Next month, we have more on textfiles and Word Processors. George has some fixes for Campion, and Miles some news on WordMaster. I hope by then to have found a bit more SAMstuff, too, for this seems woefully short. Until then, many thanks, folks, for all your snippets, and please keep them coming to me; without them I can't put a column together.

Please send them to:-

**John Wase,
Green Leys Cottage,
Bishampton,
Pershore,
Worcs,
WR10 2LX.**

See you next month.

SAM GAMES AVAILABLE FROM REVELATION

SOPHISTRY

One of the **BEST** licenced games on SAM. Originally produced for the Spectrum by CRL, and now brilliantly converted for SAM, Sophistry is a game that is big, perplexing, colourful, frustrating, musical, bouncy, and above all **DIFFERENT** (and it even has the Spectrum version built in so you can take a trip down memory lane).

£9-95 (£8-95 to INDUG members)

TNT

Written by industry mega-star Matt Round - A game packed with humour, colour, sound and **above all ACTION!**

Loosely based on **Bomb Jack** (the game SAM owners have most requested over the years). As well as the normal one player game, TNT has gone one better by giving you **TWO** player action - competing against each other, in full glorious technicolour - at the *same* time. It even has a novel feature in a SAM game - a High Score Table, how many others have that?

Avoid the meanies, collect the bonus points, Jump, Hover, Fly - what more do you want???

£9-95 (£8-95 to INDUG members)

ELITE

The legendary game at last available on SAM disc. Using the code of the Spectrum version, long thought the best after the original BBC version, this game is a must for everyone who loves action and adventure. Full manuals, story book and packaging.

£14-95 (£11-95 to INDUG members)

GRUBBING FOR GOLD

GRUBBING FOR GOLD - the most advanced, the most playable, the most enjoyable quiz game since the legendary Quiz Ball. They said it could not be done - they said bringing a TV quiz show to SAM would not work. Well let them eat their hearts out because **YOU GOT IT...**

Hundreds of questions, on a wide variety of subjects at levels to suit most people, it includes a question editor so you can create your own sets of questions. This is the game you can never grow out of.

£9-95 (£8-95 to INDUG members)

Send SAE for full list of available games.
Games/Utility Programmers Urgently
Required

REVELATION FOR THE VERY BEST IN SERIOUS SOFTWARE

> **THE SECRETARY** (Version 1.5) - The most advanced and the most widely used word-processor for SAM, powerful, versatile and easy to use. **£14.95 (INDUG £12.95)**

> **COMET Z80 ASSEMBLER** - The SAM assembler many professionals use, yet easy enough for the beginner - so why settle for second best? **New LOW Price £14.95 (INDUG £12.95)**

DRIVER

The Graphical User Interface for SAM

Comes complete with many built-in utilities and ready to run applications. Full manual and a disc-based tutorial. DRIVER gives you the ease of use only found on big office computers before. So easy to use yet so powerful. **Fantastic Value £29.95 (INDUG members £24.95)**

Now Includes FREE Copy Of DRIVER's Extras Disc 1

DRIVER's Extras Disc still available for existing users at **£5.95 (INDUG members £4.95)**

SCADs PD Yes, at last, we are pleased to re-release SCADs - the arcade game development system for SAM. Previously sold by Glenco at £24.95 we have now placed the software into the Public Domain so the disc costs you **Only £2.50**. The full manual (over 200 pages) is also available for **£12.95** (overseas please add an extra £1 to postage rates below because of weight)

- All prices include UK postage and packing (Europe please add £1, other overseas please add £2).
- Payment by UK cheque (made payable to Revelation Software), PO or cash. Sorry but we can't accept Euro-cheque or Giro.

Revelation
Software

• Please Quote INDUG membership number clearly on order if claiming discount.

• Send orders to:-

Revelation Software, 45, Buddle Lane, Exeter, EX4 1JS.

Inside

Spectrum's Tape System

By:- Ken Elston.

I know that the vast majority of us use disc systems of one sort or another on our Spectrums, but the design of our favourite computer was as a tape based machine. As such, the tape handling routines are at the heart of the Spectrum ROM and I thought it would make an interesting article to take a look at how they work.

It is also true to say that most commercial software for the Spectrum was/is produced on tape. Many use differing tape handling techniques to prevent piracy, speed loaders like Speedlock and Alkatraz are fascinating things when you study them but first, you need to look at (and hopefully, if I get this right, understand) how the ROM routines work.

Before we delve deep into the murky depths of the Spectrums ROM, let us look at the theory behind the tape system on the Spectrum.

You will all have loaded tapes at one time or another, so you will all know that you get the cyan/red lines in the border area as the Spectrum listens to the steady tone of the leader, there is then a burst of noise (during which the border changes to blue/yellow stripes if you look quickly enough), then there is a short gap, then another steady tone producing the cyan/red stripes and the more blue/yellow stripes appear and the noisy bit shows the file is loading. But what is happening?

Your Speccy is loading blocks of

information, each of which is preceded by tones that allow the Spectrum to set its own internal timing constants so the main information (in the noisy bits) can be loaded without errors.

When you save a Basic program (or any other file for that matter) with the SAVE command, you always save two blocks of data. The first one is called the *Header* and is always 17 bytes long, so short that you hardly notice the blue/yellow stripes. The second one is the read *Data* block, and its length changes depending on the amount of bytes saved. In the header you will find the necessary information the system needs to load the program such as the *Filetype* (Basic, Code, Array, etc.), the *Filename* (always padded to ten characters), the *Filelength* (of the block of data in the file) and some other things depending on the type of data you are saving; the *Data* block is the actual Basic program or piece of Code you want to save.

It may help to think of it like this:-



Actually, as is always the case with computers (don't you just love them) things are a little more complicated. Between each Leader and Header/Data block, there's something to mark the end of one and the beginning of the other, so here we find what is commonly called a *Sync Pulse*.



That's still not enough though, the system still needs a couple of extra bytes of information to make things work. The first is a *Marker*, which is the first byte of data after the Sync Pulse - this tells the system whether it is a header block (the byte is 0) or a data block (the byte is 255). The other is a *Checksum* byte used to help detect errors in loading.

For example, if you save the 6912 bytes of a SCREEN\$ file the Data Block actually has 6914 stored on tape (even if the first byte and the last byte are not ones to be stored in memory).

Ok, so this gives us the following for a Header block:-

Leader	Sync	Marker (0)	Header	Checksum
--------	------	------------	--------	----------

Followed by a short gap and then the Data Block:-

Leader	Sync	Marker (255)	Data	Checksum
--------	------	--------------	------	----------

This format is valid for every kind of files saved using the Basic SAVE command. The contents may differ, the format does not.

Now let's have a look to each component in detail.

The *Leader* is an introduction to the *Data*. It is a simple square wave tone generated at a frequency of just over 800Hz. It is used simply to allow the system to 'get in step' with the tape signal. There is usually about 5 seconds of Leader at the start of each block. It is created by sending mic-on and mic-off pulses, each of the same length (2,168 T states long to be exact) Remember that there is no information stored in the Leader.

The *Sync Pulse* is the end-marker for the *Leader*. It is actually two pulses, one of about 2600Hz (667 T States long), and a second one of around 2300Hz (735 T

states long);

In normal tape blocks, each bit is saved with a standard frequency dependent on its state (on or off). A 'set' bit (one that is on) is a tone of approximately 1020Hz made by turning the mic on for 1656 T states, while a 'reset' bit (one that is off) is a higher tone of around 2050Hz (801 T states).

The *Marker*, as we have already discussed, is a byte that tells what type of Block is being handled. Zero flags a Header block, 255 flags a Data block.

After the Marker comes the real information. In a header this is the 17 bytes of details about the file we looked at on the last page. In a Data block this is the sequence of bytes in memory that were saved to the tape. If it was a Basic program then it is every byte from the start of Basic area to its end.

Then finally the *Checksum*. This byte is for error checking: when saving, the content of a register (which is initially set to 0) is XORed with the current byte that has to be saved, even the marker; at the end of the save operation this byte is saved too. The same thing happens when loading in a block, so that the last byte loaded will be XORed with the register above, if the result is zero then the loading was OK, anything else will produce a tape loading error.

Right, that is where I'm going to leave things for this time. When I return (next month I hope) we will start to look at how the ROM routines actually work.

In the meantime, get out a tape and play it - see if you can hear the different signals. Load it into your Spectrum and pay attention to the lines in the borders, it is amazing what you can tell just by looking at all those coloured stripes. Just don't put yourself into an hypnotic trance or you may miss my next instalment.

Keep It Simple, And Make It Reusable.

By:- Gordon Fowler.

THE ART IS SIMPLE

After many years in as a professional programmer I can safely say that experience has taught me "The art of good programming definitely lies in complexity control."

In other words, put bluntly, a simple program is a good program.

The only problem with these platitudes is that it is difficult to know exactly what a simple program is. Obviously a program that does very little (adds two numbers together and prints out the answer, for example) is simple just because it does virtually nothing. That's not to say that you can't make such a program appear more complex than it is - but when stripped down to its bare essentials it is still simple.

The idea that a program shouldn't appear to be more complex than it actually is, gave rise to structured programming and the general idea that formatting and layout should be used to help clarify the meaning of a program, something SAM Basic does quite well.

The really interesting question is: what do you do about complexity when you have cleared up its unnecessary components? In other words, suppose that you are writing a program that does quite a lot and is therefore intrinsically complex. No amount of structured programming will succeed in producing a simple program.

The traditional answer to this problem has been to introduce the notion of

modularity - that is, break the program down into little bits. The idea here is that even if you have a complex program, each little bit will be simple because little bits of program don't really have the scope to be much else!

Modular programming is wonderful and if you haven't discovered it yet, you don't know what you're missing - but it only works up to a point. Most of the programming methods that take it as their central tenet don't get much further. They are mainly rules for bookkeeping in programmer teams or graphical aids to documentation and so on. They help you organize complexity up to a point, but at the end of the day it is the way you break the program down into modules that is the real weapon against complexity.

EASING THE PAIN

If you have used modular programming for a while, you very quickly come to discover under which carpet it sweeps the complexity inherent in so much modern programming.

Even if you have managed to decompose a large and complex program properly into subroutines/procedures, and there are plenty of ways of getting it wrong, then it can still seem overly complex. The reason is mainly due to the need for the parts of the program to interact.

In the ideal world (let me know if you ever find such a thing) each procedure is small and simple and carries little

complexity, but the whole program can become a hierarchy of procedure calls and a web of parameter passing.

I could go into the theories of how procedures interact and discuss ideas such as cohesion and coupling, but this would miss the point that every programmer knows - passing parameters is a pain.

For example, suppose you are writing a program to do some difficult sums. Most of the procedures that make up the program will need to be told the array that they are working on, and possibly its size as well. This means that every procedure will have the array name 'A' and its size 'M' by 'N' passed as parameters. In many cases this will be true of several other variables used in the program, and I can't be the first programmer who has become tired of typing very long and virtually identical parameter lists in each procedure definition.

With this realization, many programmers crack and revert to bad habits, such as making the array and its size parameters global, and therefore accessible to all parts of the program without having to be passed as parameters.

Although most programming text books will tell you that global variables are (in general) bad, they don't often discuss this specific use. Using global variables in this case has the advantage that it eliminates the said variables from all of the parameter lists. Its only disadvantage is the original sin committed by all global variables - a global name.

If you've called a global variable TOTAL, then that's the name that you have to use in all procedures that refer to it. You cannot use SUM or SUMTOTAL

or any other name, and you cannot use the name TOTAL for any other purpose in any procedure.

The advantage of a parameter list is that it allows the name of each quantity passed into the procedure to be determined locally. You can look at the parameter list when you are writing the procedure for all of the variable name definitions and ignore any naming conventions used in other parts of the program. In other words, parameter lists allow you to ignore any complexity in the program's structure due to variable names.

Variables inside the procedure are connected to variables outside the procedure by their position in the definition and call parameter lists. Instead of having to remember the names of the variable used by other parts of the program, you have to remember the order of the variables in the parameter lists.

In theory, the need to get the order of the parameter list right in exchange for the freedom to use any name in a procedure is a fair trade. But parameter lists in a big program?

The amazing thing is that the variable names don't change! In other words, if the array is called TOTAL in the called program it is usually called TOTAL in the procedure! We seem to have a contradiction here.

SHIFTING EMPHASIS

So, parameter lists are a pain and we don't seem to get universal benefit from them anyway - so perhaps global variables aren't such a bad thing?

The reason why global variables are still a bad thing is because they make procedures non reusable. Modern programming methods can produce, by

natural progression, a procedure library. A collection of procedures that, in themselves, have been tested in the red-hot forge of a working program. You know what they do and how they do it and so they are ideal for re-use in other programs

Look at it this way. The writers of the Basic ROM gave you reusable procedures called PRINT and SAVE and DIM - all of them reusable for what you want to do. So why not a procedure like, for example, BOX. Lets see a bit of code:-

```
1000 DEF PROC BOX X, Y, H, W, I
1010 PLOT PEN I, X, Y
1020 DRAW PEN I, W, 0
1030 DRAW PEN I, 0, H
1040 DRAW PEN I, -W, 0
1050 DRAW PEN I, 0, -H
1060 ENDPROC
```

Now I think you will agree, you can't get much simpler than that. For some strange reason SAM Basic does not require the parameter list to be in parenthesis - while most other Basics do, however, we don't need to get into that debate here.

Ok, the procedure 'BOX' takes five parameters, the X and Y co-ordinates of the bottom left-hand corner of the box you wish to draw, its height (in pixels) and its width (again in pixels) and finally the ink (PEN) colour you wish the box to be drawn in. This is a very simple example of a procedure that could be used over and over and over again in program after program - an ideal candidate for your procedure library.

In this example, if the variables had been global, or worse still if they had not been variables at all, then the BOX procedure would have had fewer uses.

In some modern computer languages this idea is taken to extremes - in a

system known as the object-orientated method. Here the global data structure is made central to the program. The name of the central data structure, for example the array TOTAL, isn't known to other parts of the program because it is only available to them via the procedures or methods in the object jargon that are declared along with it. Instead of having to know (and so fix) the name of the global data structure, this is hidden - but you now have to know the global names of the methods that use it. However, it doesn't entirely get rid of the problem of global names - it simply shifts the emphasis from the data to the methods.

Returning to SAM Basic, it is worth noting that you can use the LOCAL command to tie variables to your procedure. Once declared as local a variable only has its value within the procedure (be very careful using LOCAL within procedures that are called by procedures - it is easy to get yourself confused as to which copy of a variable is being used). Remember also that a local variable will be lost as soon as you exit the procedure that uses it - by its very nature it can't be used globally.

I hope this has given you some food for thought. Programming can be a very rewarding experience when you get it right, and keeping it simple will help you to get it right more often than you would otherwise.

Remember that a house is built of bricks, one brick at a time. You need plans, but you also need the bricks. Build yourself a collection of simple subroutines and procedures and you will find that writing a new program becomes so much easier. You can get on with the exciting bits because the mundane bits have already been done - long ago.

SMALL ADS

For Sale SAM Coupé 512K with 3 1/4" drive, comms interface, mouse, tape deck autoboot chip, dust cover, PC Suite, MasterDOS, sequencer and other software £150 + postage. Call Stewart on 01525 373979

Two Freebies. (only postage will be asked for)

A) 48K Spectrum in Lo-Profile Case - full sized keys incl Numeric Key Pad with cursor keys, NMS tape controller with volume controlled sound amplifier, Off-On switch Power supply Manuals. Postage under 81bs

B) BETA-BASIC News Letters complete 1 to 15. (Some written on).

PLEASE - Write only (Deafness means I can't take phone calls)

As each letter is received it will be given the next number A) 1 to n. B) 101 to n Six weeks after I receive my copy of **FORMAT** printing this notice, **RANDOM** will be entered in my SAM to select winner Eric Day, 46, Anglesey Way, Porthcawl, Mid Glam, CF36 3QP

For Sale Large collection of SAM software SAM Paint, Football Director 2, Splat, Multipack 1, Defenders of the Earth, Five on Treasure Island, Quizball, TnT, Grubbing for Gold, The Secretary, Escape from Robot Monsters, Mind Games 1 £35 the lot. Tel Nick on 01635 871108

Wanted Desperately seeking an emulator to make my wonderful accounts program work on a PC. Please telephones with a price or information for George on 01328 700250

YOUR ADVERTS

Selling, Buying, Pen Friends, etc.

Any **PRIVATE** advert, subject to acceptance, will be printed **FREE** in the next available issue. Any software sold **MUST** be original. The publishers will not be held, in any way responsible for the adverts in this column.

Due to shortage of space if your advert remains unpublished after two months then please send it to a general Trade Advertiser contact the publisher for rates.

Please note. Adverts now run in both **FORMAT** and **FORMAT PC** to give you twice the market.

FORMAT

SAM REPAIR SERVICE

We are pleased to be able to offer readers an official, West Coast approved, repair service for SAM Coupé and SAM élite computers and add-ons

PRICING Because every fault is different we can't guarantee a fixed rate. When we receive your machine it will be tested and, if it is going to cost more than £35 for the repair then we will contact you for authority to repair.

Pack your machine well (we will use your packing for its return). Please phone us on 01452-412572 for advice on dispatch (we can even arrange UK Mainland collection and overnight delivery for an extra £12.95). In many cases we can also give an estimate over the phone. All repairs returned by overnight carrier so tell us which days there will be someone in to sign for the parcel. Please quote your INDUG membership number and give a evening contact phone number.

Send your machine to

Format (SAM Repairs),
34, Baurton Rd, Gloucester, GL4 0LE

SPECIAL OFFER

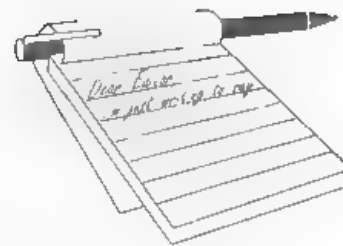
If you followed our recent SAM C series do not already own a copy of SAM C from Fred Publishing then now is the time to get your copy.

In conjunction with Fred Publishing we are making an extra special offer to **FORMAT** readers which allows you to order a copy of SAM C direct from us at

HALF PRICE!!!

Just send a cheque for **£10** (overseas customers £12) to us at Format Publications and we will send you the full version of SAM C complete with manual, so you can start learning this powerful language.

Do not send your orders to **FRED** this offer is only available from us by mail-order.



YOUR LETTERS

Dear Editor,

Here are some thoughts on SAMson. In one way they are a bit depressing, but there is a happy ending.

I started making a wish list, of things like instant Spectrum emulation, a real serial interface so I can plug in a modem and get online, built-in mouse circuitry and so on; and then I realised I was simply describing a typical PC running Z80em. The only difference was SAM compatibility.

So I thought, which is easier, to re-engineer SAM or to write a SAM emulator for the PC? Which is cheaper, a SAM surrounded by a forest of adapter circuits for hard discs, modems, mice and the like, or a PC which uses them all in their native form?

If SAM became just a software product, could it do more than gently fossilize the way the Spectrum has?

My thoughts turned to my Paion Series 5 pocket computer (on which I am writing this letter). Besides having its own Spectrum emulator (of which more another time, Bob), it has a programming language, called OPL, which is rather like a structured Basic. As a SAM user I was surprised how familiar it looked. Just no line numbers any more. Far easier for me than the curly-bracket jungle of the recent 'C' articles in **FORMAT** or of JAVA. The point I am making is that, if OPL can be a respectable programming language, SAM Basic can too. Indeed, I use it for original research into polyhedra (crystal-shaped solids).

I am sure that, with careful thought

SAM Basic could be developed into a useful programming language. But it will need a wider market than the SAM hardware to be worth the effort.

After all, even if West Coast do develop some nice add-ons, who would ever buy a redesigned SAM? We old lags will just want to replace our old Coupés so we can rouse all our existing add-ons, and what new user would shell out for a hard disc-ed, online, mega-sound SAMson when a better-spec'd PC can be had for less?

Do you remember the Amstrad PCW and Locoscript? Locomotive software are still going with a respectable turnover, selling new and refurbished PCs with Locoscript PC pre-installed - and to a market not a million miles from SAM's own.

You know, I'd buy one with SAM PC pre-installed.

Yours sincerely, Guy Inchbald.

There is already an excellent SAM emulator on the PC called SIMCoupé which I hope we can do a full review of soon. However, there is nothing quite like the real thing, so I hope to see SAM hardware continue for a good few years to come.

I agree that a PC Basic, based on SAM Basic, which is of course based on Spectrum Basic, would be a nice idea - the big question is *who could write it?* Personally, just getting a few people together to help sort out SAM's ROM and DOS is a hard enough task - it seems that there are still too many people whose main interest is coding stupid scrolly demos which serve no purpose.

other than to inflate their own egos for five minutes. I've said it before, and no doubt I'll say it again, if just 10% of the talent in the SAM world was capable of being properly managed on professionally formulated projects, then the SAM world would have software and hardware coming out of its ears.

As to the question "would a new SAM sell?" Well I think the answer is yes. I think there will always be a market for a nice friendly machine like SAM. *Ed.*

Dear Editor,

Just a note to let you know that I have received my copy of the SAM C disc together with my copy of the March *FORMAT*. I am sorry that you have not had many replies to your request for ideas to improve the SAM Computer's performance. A lot will depend upon the costs involved and how far it will be able to meet the modern development.

I am sure that many would like to see a hard disc incorporated in the set up and possibly a room for a modem. The change in the supply of discs from DD to HD means that the disc drives require altering to meet the extra power needed for the modern HD Discs is just one of the minor changes needed. In order to meet the future trend the computer should be adapted to the use of CD-ROMs; by the time the new computer is ready these will be in common use.

The future users of our SAM Computers will without doubt be craving for a machine that will immediately boot up with a DRIVER type screen. There will be many other small items that will come to mind but I am sure that the main difficulty will be the cost involved.

Yours sincerely, John Thornborrow.

I agree with you on the hard drive front John, but before that can become a universal part of every SAM owner's set-up I think there is still a lot of work to do on the software side (both the

HDOS system and application software).

As to high density drives, that also would require extensive rewriting of the existing DOS, I doubt that most people would consider it worth the effort but I would be interested in hearing reader's comments on the subject.

Thanks you for your input John. Much appreciated. *Ed.*

Dear Editor,

I, and I am sure our regular readers commiserate with you in your misfortune regarding the break-in earlier this year.

A year ago a solicitor friend of mine had all his office equipment stolen and temporarily did much hard to his practice.

His insurance company suggested that he had his replacement equipment and the desks, etc., screwed down.

So, he engaged the services of a small local engineering firm who made steel plates for him, with the very wise suggestion that he had *left handed screws and bolts* made. So that the more the thieves tried to unscrew the units the tighter they made them.

Kind regards and the best of good wishes to you and Jenny.

Yours sincerely, Eric M.Day.

Thanks for your kind thoughts Eric, and the left handed screws are a nice idea. *Ed.*

Dear Editor,

Whilst ordering some back issues for my son David, who is away on a course at the moment, it seemed sensible to mention a problem that he encounters, which I have seen mentioned in *FORMAT*, but have seen no answer that seems to work.

It is the old chestnut, perhaps, of 'Lords of Midnight' locking up at night time if a PLUS D is attached. I have tried this POKE @11,1 that was suggested, but to no avail and the only other snippet I could find suggested poking a location in

ROM, if only you could!

Is there an answer, or is it just to remove the PLUS D and use tape back-up?

I must say, as a Spectrum fanatic, I enjoy the articles in my son's *FORMAT*, but advancing years and retarding faculties mean that his *FORMAT* PC is a bit over my head.

All the best,

Yours sincerely, B.J.Russell.

Now that is an old one, and I've searched through my stuff to find an answer and I can't find it. I know I've been given a set of pokes to mod the program so it works, but it has been so long since the last request that the sheets of paper have become buried under years of other notes. So, can anyone help? *Ed.*

Dear Editor,

First, my thanks to Jenny for her cheerful efficiency in sending my recently ordered copy of SAM C together with issues of *FORMAT* and *FORMAT* PC. Once again the disc's dust-cover had been mangled in the post despite being carefully packed inside the manual for protection, but fortunately, I was able to straighten it and the disc loaded OK. Whether I will ever get to grips with C remains to be seen, but I will enjoy exploring the 'new' language.

I was sorry to learn of your problems due to the break-in and am relieved that you are recovering from it. Of course, a fire could be even more devastating and maybe you should consider some kind of rotated three-level back-up storage at other locations for the more critical data. I realise that this all takes time and of course, restoring from tape is rarely straightforward as was the case in this instance.

Reference the discussion on binders, I too use the Smith's type binder, bought from Staples, and use one per volume which, provided the issues don't have too many pages, works well. Don't let that

aspect restrict you though, the bigger the issue the better. As long as your margins (in the mag, not your profits) stay the same, I agree with Bill Lawrie that punching the required holes causes no problems.

I did not understand your comment about Tandy discs (John Thornborrow's letter issue 7) as their price is similar to your offer in issue 8.

At present I also buy my discs from Staples, a pack of 10 by Precision already labelled and un-formatted for £2.54, as per enclosed disc (for Jenny's benefit). Argos also do a similar disc at £3.29 for 10. How much longer these stores will continue to supply these discs remains to be seen of course.

I see on the box of the Precision discs that they are made in the USA, assembled in Macau and distributed in England by a firm called Dysan. Maybe you could do a deal with them direct or perhaps via Staples.

Getting back to SAM C, my first task, after making a back-up copy was to use my index to list all references to C in recent *FORMAT*s and to add comments against each item. From speaking to Jenny and reading the letters pages I deduced that other members had also taken advantage of the reduced price to purchase C so I have included this listing which others may find helpful.

SAM C

- (N)8/7/4, News page
- (R)8/10/15, Review - Nev Young
- (R)8/11/17, Review - Carol B
- (L)8/11/35, Various letters
- (A+P)9/1/23, C add ons - Carol B
- (H)9/3/23, Paging in C
- (L)9/3/37, Letter re modulus function
- (A+P)9/4/23, Autostereogram - see also V9/5/23
- (L)9/5/23, Letter re Carol's article V8/11/17
- (H)9/6/19, syntax
- (A+P)9/6/23, C-Maths using SAM FPC
- (L)9/6/29, syntax etc.
- (N)9/7/4, SAM Vision launched with extra features!

/21, C-Maths 2
 (L)9/8/33, Learning to program in C - Babani
 (S)9/9/13, 'myatify' prog in C
 (H)9/9/19, Ray's endorsement for Babani book
 /23, C-Maths 3
 (H)9/10/18, scanf problems
 (A)9/11/27, SAM Vision - mods and reviews - Carol B
 (A+P)9/12/17, Talking C - tutorial
 (A+P)10/3/35, Talking C 2 - tutorial - see also V10/5/24
 (A+P)10/4/25, Talking C 3 - tutorial
 (L)10/5/24, Talking C - corrections
 (A+P)10/6/15, Talking C 4 - tutorial
 (A+P)11/2/11, Minefield 1 - tutorial
 (A+P)11/3/17, Minefield 2 - tutorial
 (L)11/3/24, Minefield - comments
 (A+P)11/4/24, Minefield 3 - tutorial
 (A+P)11/6/25, Minefield 4 - tutorial
 (A+P)11/7/5, Minefield 5 - tutorial

On first loading C I was a bit disillusioned when the message 'COMET COMPATIBIL' was displayed. It does seem that if you are proficient in machine-code then spelling and grammar often take second or third place. For me this spoils the presentation and I tend to wonder 'what sort of Mickey Mouse program is this' which no doubt is unfair. Fortunately, for me anyway, I have been able to modify my copy to read correctly. My next problem was that the cursor on the main menu would not respond to my mouse movements. Having tried different versions of MasterDOS to no avail I eventually found the options menu and was able to switch the mouse option ON. Later on, when reading through the manual I found this was all explained. Oh well. If all else fails ... etc.. Of course, time will tell whether I need the mouse control at all.

The same thing applies to the main menu of the Zeus Assembler, but of course this is not mentioned in the manual as Zeus was not included in the original issue. Also, of course, the listing of the directory in the back of the manual is quite different to the directory of SAM

Vision. Also, the example programs mentioned in the manual are missing. I am sure that I will find Carol Brooksbank's articles on this subject extremely helpful as I have come to admire (and envy) her many talents in this field and trust her judgement implicitly. (Happily her command of English matches her ability in m/c). I am, therefore, a bit concerned when Carol states in her article in Vol.9 N°11 page 28 that "It (SAM Vision) is a supplement not a replacement (for SAM C)".

Carol also speaks of a SAM C handbook, which I presume I have, and a SAM Vision handbook which I don't have. My disc is labelled SAM C ©1995, but loads in SAM Vision, I think, according to the loading screen and has the Zeus Assembler incorporated. The info box from the File menu however states 'SAM C Version 4.21 Released 17 October 1995'. So, presuming I have got SAM C, do I need and can I get SAM Vision?

I would be grateful if someone could clarify exactly what I have got and what else I might need.

The Minefield series of articles also carries the warning that it is based on the standard version of SAM C, not SAM Vision. I'm beginning to think that 'minefield' is going to prove quite appropriate to this exercise.

In the meantime I have quite enough to get on with just playing around with and getting the feel of this utility. I also intend investigating what the two 'input' options are that replace the 'scanf' function mentioned in Ray Bray's reply to John Saunders in V9/10/18.

I recently sent off to Maplin for various odds and ends I needed and noticed that they could supply various books on learning C including the one recommended in *FORMAT* by Babani which I now have, so unless anyone advises me differently I think I have enough to make a start.

If I make any serious progress I will let you know, but I suspect it will not be long before I will be writing to the *Help Page*.

Regarding further development of the SAM Coupé, Stage 1 items a and b would be appreciated sooner rather than later as would Stage 2 items b, c, d, and e. However, with the current dearth of hardware development and the problems there have been with producing the SAM clock for instance, I fear a lot of this is the stuff that pipe-dreams are made of. On the other hand, if you don't dream and try then you can be sure nothing will happen. I just hope that those with the necessary talents will come forward and give SAM a chance.

My thanks again to you and all those involved in maintaining and developing interest in the 8 bit scene.

Yours sincerely, Maurice Smith.

Phew!!! Lots there Maurice.

First, yes it is confusing, but SAM Vision (the add-on pack for SAM C) is not the same SAM Vision that is mentioned on the SAM C loading screen - that was (as far as I can tell) a group of programmers the author was associated with in his own country of Slovakia (which also explains some of the spellings).

We had hoped to include a special offer for SAM Vision with the shipment of SAM C, however, the continued delays with relaunching FRED put paid to that, for now anyway. *Ed.*

Dear Editor,

Referring to SD Software' PC Suite; sorry if I'm thick, but the blurb says copy SAM data files to PC; is it possible to format a disc on SAM to IBM standards then SAVE to this disc a SAM game written entirely in Basic, so that the game can be played on a PC? If so, do you happen to know whether this will work on the TINY range of PCs?

Yours sincerely, Roy Gardner.

Well you can transfer the Basic program Roy, but you would have to make the necessary syntax changes to get it working with a PC Basic compiler/interpreter. Not an easy task to undertake but not an impossible one. *Ed.*

Dear Editor,

We out here on the other side of the world are trying to repair a SAM Parallel Interface (SPI) as it is too costly to send it back to England. (Plus with the mail service as it is it would probably end up in Russia).

We are having a lot of difficulty in understanding the circuitry of the interface so would appreciate if you could send a copy of the circuit diagram for the SPI.

Yours sincerely, Ken Gager, (New Zealand).

Now, which SPI? When we launched the original SPI we used a board designed by Dick Guy and made for us by P.B.T. Electronics. This was a bi-directional interface but did not prove as popular as we thought it would.

Later, following the take-over of Samco by West Coast, we did a deal with them to buy ready assembled printer interfaces. Some of these were built on Comms interface boards (with the RS232 side left off) some on XDI boards (with the external disc interface bits left off).

So, which do you have? If you take the board out of the case then if it is one of the later units it will have some writing on the board that says either MGT or Samco. If it is one of them then the board diagrams are in the SAM Technical manual. If it is one of the *real* SPIs then I have to admit that my copies of the design disappeared with PBT so I can't help at the moment but will see what I can come up with as soon as possible (I know I gave a few copies of the diagrams out to people so I should be able to track one of them down for you.) *Ed.*

Dear Editor,

Since writing to you last month, I have been trying to find my copy of Vol.2 N°3 April issue of **FORMAT PC** but without success, it must have somehow been thrown away. So please could you send me another copy. I enclose a cheque for £2.50. Hope this is correct.

I am very sorry to hear about all your troubles, hope you are beginning to get things sorted, you must have been devastated.

I would like to say how much I am enjoying the various Basic programs which have appeared in both **FORMAT** and **FORMAT PC**. I have never been able to program anything on my PC. I never thought it worthwhile to even try Qbasic. It certainly takes some getting used to, after SAM and Spectrum Basic.

There was one program in SAM basic that interested me. (**FORMAT** April 98), the one offered by Mr Hunter of Ogmere-by-Sea, the one for calculating PI, to any number of decimal places. I have not tried it out yet, but what I did was to try and separate out the part of the program that actually calculated PI. I am no mathematician and it has always intrigued me how this is done. I am not particularly interested in the timing part, - **Just how is PI calculated??**

Certainly, it is not a case dividing 22 by 7 as even I realise that is only an approximation. So this is a good example of what many readers may find a very interesting letter. I for one look forward to being enlightened.

Yours sincerely, Wilf Smith.

If I can find someone to write it then I think an article (or even a series) on mathematics in programming would be of interest to quite a few people Wilf (including myself - I well remember, years ago, needing the maths to allow a bomb to drop realistically from a plane). Thank you for the idea.

Now, the big question. "Is there anyone

intested in writing said article(s)?" If so get in touch please. *Ed.*

Dear Editor,

Here are my comments on the future of the SAM.

I like the idea of an adaptor allowing Spectrum add ons, being able to use on the SAM, though I wonder if in the long term an adaptor that allows some SAM add ons to be used on the Spectrum might be a better idea. The idea of a Spectrum ROM on the SAM is an idea I like, though how many people will get one if it is not both 48 and 128 compatible remains to be seen.

In future I believe it would be ideal if the SAM could use some PC products, joy-sticks, monitors etc., through interfaces if need be.

I have a Quazar Soundcard and have ordered a clock, I would be interested in the removeable hard drive and also in some sort of memory expansion.

I think it is getting to the time when the SAM should be produced with 1.44mb disc drives, before DD discs become too rare.

Also I know it is few years off before analogue TV is completely phased out, but will a SAM work on a digital TV set.

Yours sincerely, James Loder.

I don't think it would be possible to produce an adaptor to allow SAM add-ons to work on the Spectrum, but it may be possible to produce Spectrum versions of a few things in the future.

As to Analogue TV, well if the phase-out of 405 was anything to go by, the Analogue TV will be around for many years to come. *Ed.*

Letters may be shortened or edited to fit on these pages although we try to edit as little as possible.

This is YOUR letters page so it is up to you to fill it with interesting things. Come on, get writing, any subject even remotely related to computers. Just keep things as short as you can so we can fit in as many as possible each month. Please write clearly or type your letters. Send them to the address on page 3 or email them to us at Formatpub@aol.com.

SOFTWARE

SAM Coupé Software On 3 1/2" Disc

PCG's DTP PACK. The famous package including WordMaster, TypeLiner & HeadLiner. Complete on disc for SAM. Includes 2 extra font packs bringing the total value to £53.40.

Order Code: SCD-04 Price: £24.95

COLOUR DUMP. Screen dump software to work with Epson compatible colour printers. RRP £12.95

Order Code: SCD-05 Price: £7.95

MasterDOS. The advanced Disc Operating System for SAM. Includes random access files, sub-directories and lots more.

Order Code: SCD-31 Price: £15.95

MasterBASIC. Extended Basic for SAM, works with either MasterDOS or SAMDOS.

Order Code: SCD-32 Price: £15.95

Order Both MasterDOS & BASIC Together and SAVE £5.

SAMSPEC SOFTWARE

SAM + Spectrum versions on one disc (5 1/4 or 3 1/2")

FONT LIBRARY. 100 screen fonts plus support software, easy to use on either computer. (Special 3" disc available - Spectrum files only). RRP £8.95

Order Code: SSD-01 Price: £5.95

MONEY MANAGER. Advanced personal budgeting system for both machines. Spectrum version needs 128K+2 (not +2a or +3). RRP £15.95

Order Code: SSD-02 Price: £9.95

SPECTRUM SOFTWARE

Unless otherwise indicated these are DISCIPLE/PLUS D programs. Please state 3 1/2" or 5 1/4" disc (80 track only) on order.

ARTIST 2. The best art package ever written for the Spectrum. 48K and 128K versions on the same disc. With page-maker and utility software. Full manual. RRP £19.95

Order Code: SPD-01 Price: £12.95

UTILITY DISC #1. Six of the best and most useful disc utilities for DISCIPLE or PLUS D. Added bonus program - not to be missed. RRP £9.95

Order Code: SPD-02 Price: £6.95

PCG's DTP PACK. The famous package including WordMaster, TypeLiner & HeadLiner. Includes 2 extra font packs bringing the total pack value to £53.40.

Order Code: SPD-04 Price: £24.95

+3 Version: SPD-04C Price: £29.95

3 1/2" DS/DD BLANK DISCS

Good quality 80 track DS/DD 3 1/2 inch disc, suitable for DISCIPLE, PLUS D and SAM. Sold in packs of ten with labels. (Overseas customers please add £1.50 postage not 10% as on other items.)

Order Code: DSDD10 Price: £3.75

FORMAT

READERS SERVICES

FORMAT BACK-ISSUES

Volumes 1, 2 and 3 are now out of print. Volumes 4,5,6,7 and volume 8 are available as complete volumes. Order by giving the Volume N° (i.e. V5).

Price: £14.00 per volume.

All issues, from Volume 8 N° 1 (September 1994) to the latest issue, are available separately. To order just quote the Volume and Issue N°.

Price: £1.75 each, (5 or more £1.50 per copy).

HARDWARE

DUC LEAD. For use with DISCIPLE or PLUS D. This 'Dueling Up Cable' allows two disc drives to be attached without the need for opening one drive to alter its ID. Allows you to switch drives to even out wear without opening cases. RRP £16.95

Order Code: DUC-01 Price: £11.95

PRINTER LEAD. Top quality parallel printer lead (BBC standard). 1 1/2 metres long (approx). For use with DISCIPLE, PLUS D or SAM. RRP £10.95

Order Code: PPL-01 Price: £7.95

+3 PRINTER LEAD. For +3 or +2a. RRP £12.95

Order Code: PPL-02 Price: £9.95

SAM COUPÉ TECHNICAL MANUAL Version 3.

The real inside info on SAM. No SAM is complete without one. RRP £16.95

Order Code: STM-01 Price: £12.95

SAM_CLOCK

The SAM_CLOCK is fully compatible with the TIME and DATE functions of MasterDOS and has an integral battery that keeps the board functioning when your SAM is switched off. The board fits onto the expansion connector at the back of SAM but comes with a built-in through-connector so you don't need a Two-Up to use it in conjunction with another interface. R.R.P. £29.95

Order Code: SCH-01 Price: £24.95

ORDERING. All prices include UK p&p, overseas readers please add 10% to for extra postage.

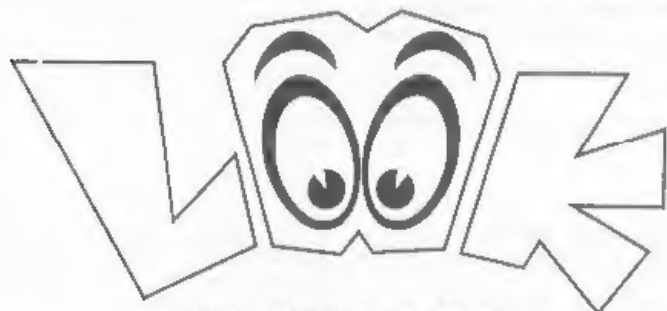
Clearly state Order Code, Product description, Quantity required and Price. Remember to add any postage and don't forget your Membership Number or we can't process your order. Payment in STERLING by Cheque (drawn on a UK bank), P.O. Euro Cheque or Cash. Make cheques payable to **FORMAT**. Payment **MUST** be in same envelope as order. Send to **FORMAT's** address on page 3. Normally dispatch is at the same time as your next issue of **FORMAT**. We will not be held liable for delays or non-delivery due to circumstances beyond our control.

DO YOU HAVE A FRIEND WHO IS
LOOKING FOR THE VERY BEST IN

SAM, Spectrum
or PC

SUPPORT?

THEN TELL THEM THEY NEED



NO FURTHER

Just send us their name and address and we will send them
the details of INDUG membership and all we have to offer.

Go On, Do Your Friend A Favour - And Yourself.

INDUG

The INDEPENDENT User Group

% FORMAT PUBLICATIONS, 34, Bourton Road, Gloucester, GL4 0LE.
Telephone: 01452-412572. Email: FormatPub@aol.com

Vol.11 Nº11.

July 1998.

FORMAT

THE HOME OF Z80 COMPUTING



Fancy FREE issues?
Want to see bigger magazines?
Then look inside for the start of our
1998 Membership Drive.

Your User Group Needs
YOU!

£2.00 (UK R.R.P.)

ISSN 0963-8598.